



Laparoscopic and histopathological diagnosis of different intra-abdominal lesions in dogs

S K MAITI¹, P AJITH², A DUTTA³ and N KUMAR⁴

Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh 243 122 India

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ABSTRACT

Sixty clinical cases of dogs involving peritoneal cavity were subjected to laparoscopic examination after routine clinical and biochemical examination. Intra-abdominal pathologies including intestinal torsion, intestinal intussusceptions, intestinal adhesion, intestinal impaction, mummified fetus, polycystic ovarian and uterine growth, persistent corpus luteum, splenomegaly, splenic abscess, splenic tumour, chronic hepatitis, cirrhosis, hepatomegaly, liposarcoma of liver and bridging fibrosis of liver were diagnosed by laparoscopic examination. Biopsy of the diseased organs was taken using laparoscopy and histopathology of laparoscopic biopsy samples in diagnosis and confirmation of different abdominal affections.

Key words: Canines, Intra-abdominal diseases, Laparoscopic examination, Laparoscopic biopsy

Laparoscopy provides distinct advantages over conventional laparotomy and diagnostic procedures include radiography and ultrasonography. Minimal invasiveness with maximum visibility, shorter surgical time, decreased postoperative discomfort and pain, less incidence of infection, uncomplicated healing with minimal scarring, minimal surgical morbidity, rapid patient recovery and diagnostic accuracy make laparoscopy as an ideal technique over many other invasive procedures (Fantinatti *et al.* 2003, Dutta *et al.* 2010, Maiti *et al.* 2008a, 2008b, 2009, 2011). The most common indication for laparoscopy is to examine and biopsy of the different abdominal organs or masses. The aim of this study was to use this technique for diagnosis of different intra-abdominal disorders in different clinical cases in dogs.

MATERIALS AND METHODS

Laparoscopic examinations were performed under general anaesthesia. All the animals were fasted for 24 h before anaesthesia. They were pre-medicated with atropine sulphate at 0.04 mg/kg subcutaneously. After 10 min, general anaesthesia was achieved with a combination of xylazine hydrochloride at 1 mg/kg and ketamine hydrochloride at 10 mg/kg intramuscularly. The animals were maintained on

halothane anaesthesia. All the internal organs includes stomach, intestines, liver, gall bladder, spleen, pancreas, kidney, urinary bladder, ovary and uterus etc were visualized directly and examined carefully and repeatedly using standard laparoscopic procedures (Maiti *et al.* 2011). The biopsy was carried out by cutting the tissue and the site was cauterized with the same forceps. The biopsy site was re-examined for any hemorrhage at the site. The tissue samples obtained was taken out and transferred into 10% formalin saline solution for fixing and later submitted for histopathological examination.

After decompression of the abdomen, the surgical wound was closed using two simple interrupted sutures using nylon. The surgical wound was regularly dressed in all animals using povidone iodine and antiseptic cream until healing. Broad spectrum antibiotic (ceftriaxone and tazobactam @25mg/kg intramuscularly) and analgesic (meloxicam @0.5mg/kg intramuscularly) were given to all animals that underwent laparoscopic procedures for three days.

RESULTS AND DISCUSSION

Clinical cases (60) were diagnosed by laparoscopic examination. These cases were failed to diagnosis properly either by clinically, radiologically, biochemically or even by ultrasonographic examination.

Out of 60, in 35 clinical cases, clinical signs were suggestive of liver involvement included ascites, edema of legs/ mandibular region, pale mucous membrane, normal

Present address: ¹Principal Scientist (maiti_62@rediffmail.com), ²M.V.Sc Scholar (ajithpillai@vet@yahoo.co.in), ³Ph.D Scholar, (avijitvet@gmail.com), ⁴Principal Scientist (naveen@ivri.res.in), Division of Surgery.

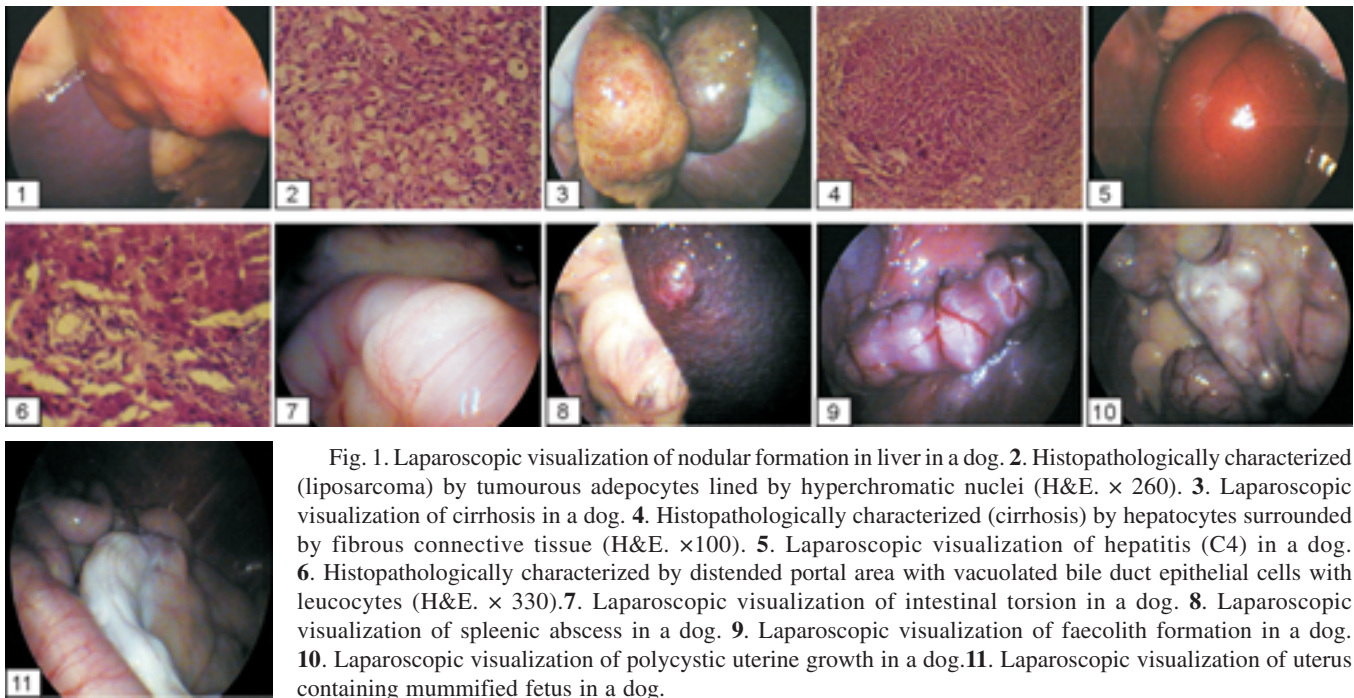


Fig. 1. Laparoscopic visualization of nodular formation in liver in a dog. 2. Histopathologically characterized (liposarcoma) by tumorous adipocytes lined by hyperchromatic nuclei (H&E. $\times 260$). 3. Laparoscopic visualization of cirrhosis in a dog. 4. Histopathologically characterized (cirrhosis) by hepatocytes surrounded by fibrous connective tissue (H&E. $\times 100$). 5. Laparoscopic visualization of hepatitis (C4) in a dog. 6. Histopathologically characterized by distended portal area with vacuolated bile duct epithelial cells with leucocytes (H&E. $\times 330$). 7. Laparoscopic visualization of intestinal torsion in a dog. 8. Laparoscopic visualization of splenic abscess in a dog. 9. Laparoscopic visualization of faecolith formation in a dog. 10. Laparoscopic visualization of polycystic uterine growth in a dog. 11. Laparoscopic visualization of uterus containing mummified fetus in a dog.

temperature, tachycardia, anorexia, polyuria, polydypsia, weight loss and abdominal pain. Electrocardiogram was within the normal range. Laboratory investigation revealed marked anemia, no haemoprotozoan parasite, normal blood urea nitrogen (BUN) and serum creatinine, low total serum protein, high serum ALT and no proteinuria. In all these cases, laparoscopic examination and liver biopsy was taken for histological examination. In 3 cases, laparoscopic examination of the liver showed pale enlarged liver with multiple circumscribed raised nodules bulging from surface of left lateral, right lateral and quadrate lobes. The nodules were round in shape and were soft in consistency. Abdominal fat showed deep yellow pigmentation. Laparoscopic examination of the liver was preferred owing to the distant advantage of its capability for visual selection of the area in the liver to be sampled. Histopathological examination of biopsy materials revealed numerous irregular areas having clusters of immature lipocytes, majority of which were round or polygonal in shape with large lipid vacuoles of varying sizes and pushing the nuclei to periphery. Some showed a round or ovoid nuclei. Mitosis was scanty. The neoplastic tissue replaced the normal hepatic parenchyma leaving hepatocytes as islands within the tumours mass. Fibroblasts were seen invading the neoplastic tissue in an attempt to unsuccessfully encapsulate it. The interstitial spaces have shown variable degree of mononuclear cell infiltration and fibroblasts. Bile ductules were also seen entrapped within the tumour tissue. These all laparoscopic as well as histopathological features were suggestive of liposarcoma (Figs 1, 2). Laparoscopic examination in other 22 cases revealed discoloration of the liver and presence of ascites

fluid in abdomen along with adhesion of gall bladder with liver lobes. The biopsy material showed widened portal areas with increased fibrosis and bile duct proliferation. Pseudolobulations were also seen compressing hepatocytes between the lobules. The biopsy material confirmed histopathologically as acute/ chronic cirrhosis of liver (Figs 3–4). In 7 cases, histopathological examination characterized by swollen hepatocytes with large vesicular nuclei and sinusoids which filled with large number of leucocytes mainly polymorphonuclear neutrophils and few eosinophils, confirmed as hepatomegaly and acute/chronic hepatitis (Figs 5–6). In another 3 cases, a normal appearance of liver in laparoscopic examination was revealed and in histopathology, a distended portal area with mononuclear cell infiltration with vacuolated bile duct epithelial cells was noticed or bridging fibrosis on the surface of the liver was detected by laparoscopic examination, but revealed no abnormalities in the histopathology.

In 12 cases, clinical signs were of acute gastro-enteritis with tenesmus followed by constipation, anorexia and intense thirst for the last 5–7 days. The animal's health condition deteriorated dramatically. Urination was normal but defecation was very scanty and blood tinged. Severe straining/tenesmus and occasional rectal prolapse were evident during defecation. Laparoscopic examination revealed intestinal intussusceptions, intestinal torsion, intestinal adhesions, intestinal impaction and sometimes it was difficult to separate the telescopic part of intestine. Successful surgical treatment was performed in these cases (Fig. 7).

In 3 cases, clinical signs were of distended abdomen,

anorexia and marked anemia. Laparoscopic examination revealed large splenic mass with multiple neoplastic nodules and blood filled cavernous areas creating asymmetric splenomegaly which occupied almost 70–80% of abdominal cavity. Splenectomy was performed under xylazine-ketamine anaesthesia. Uneventful recovery was recorded and these animals survived more than one year. Histopathology examination of these biopsy samples confirmed haemangiosarcoma (HSA). Histologically, HSAs consist of vascular spaces lined by elongated, plump, anaplastic endothelial cells. The nuclei were large and hyperchromatic and mitotic figures were also seen. The neoplastic cells had little cytoplasm and arranged in sheets or form irregular vascular spaces that were filled with blood.

In other 10 cases with variable clinical signs pertaining to abdominal pain, fever, anorexia, anemia, dullness and reproductive maladies, laparoscopic examination was performed and revealed cases of splenomegaly, splenic injury, splenic abscess, faecolith formation, polycystic ovarian and uterine growth, persistent corpus luteum, mummified fetus and haemoperitoneum (Figs 8–11).

Diagnostic laparoscopy is a minimal invasive method for the diagnosis of intra-abdominal disorders/diseases, which enables the direct inspection of intraabdominal organs and facilitates obtaining biopsy specimens, cultures, and aspiration. Diagnostic laparoscopy not only facilitates the diagnosis of intra-abdominal diseases but also makes therapeutic intervention possible. Laparoscopy is considered a modality complimentary to the current technique (Eubanks 1994).

In this study liver and splenic tumour through laparoscopic examination and biopsy was carried out and successfully diagnosed different liver, spleen and intestinal disorders includes intestinal intussusceptions, intestinal torsion, intestinal impaction, faecolith formation etc in different clinical patients. Laparoscopy successfully diagnosed the site of obstruction in all patients. Intestinal obstruction/ intussusceptions can be approached safely and effectively by laparoscopy with the intent not only to correctly diagnose the patient but also to render appropriate treatment (Franklin *et al.* 2004, Wu *et al.* 2006, Qasaimeh *et al.* 2010). Laparoscopic procedure provided a more accurate and confirmative diagnosis of intestinal intussusception in young animal (Maiti *et al.* 2009). Diagnostic laparoscopy permits visualization of the entire abdominal cavity as well as accurate localization of intra-abdominal pathology. Laparoscopy offers a minimally invasive route by which to obtain hepatic, splenic and pancreatic biopsies for diagnosis of different liver, spleen and pancreatic diseases (Twedt 1999, Karnam and Reddy 2002, Fantinatti *et al.* 2003, Para and

Reddy 2004, Webb and Trott 2008).

In conclusion, laparoscopy is an important and useful technique for diagnosis of different intra-abdominal diseases in canines when other non invasive methods were unable to make diagnosis.

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